

What we claim is:

- 1 **1.** A method for evaluating measuring signals of an electromagnetic field which is in
2 interaction with an electrically conductive fluid for detecting components in the fluid
3 which differ with respect to the electric conductivity of the fluid, characterized in that
4 the measuring signals are divided into at least two channels and are evaluated in order
5 to detect different distributions and concentrations in the fluid.

- 1 **2.** The method as claimed in claim 1, characterized in that the electromagnetic field is
2 generated by at least one transmitter coil flowed through by an alternating current, the
3 fluid is a flowing metallic melt and is penetrated at least partly by the field at a
4 measuring point flowed through by the same and entrained non-metallic components
5 are detected at the measuring point by means of disturbances in the field, with
6 non-metallic components which are entrained in a contiguous fashion in a manner
7 expanded in the direction of flow being detected in the melt on the basis of disturbances
8 in the electromagnetic field in a first channel above a lower cut-off frequency f_{Gu} , and
9 simultaneously components distributed discretely in the melt being detected in the melt
10 in a second channel above an upper cut-off frequency f_{Go} .

- 1 **3.** The method as claimed in claim 2, characterized in that the flowing metallic melt is a
2 steel melt flowing from a metallurgical vessel and the non-metallic components are slag
3 and/or gases.

- 1 **4.** The method as claimed in claim 2, characterized in that a product of cut-off frequency
2 f_{Go} and the flow speed v is between 0.1 m/s^2 to 10 m/s^2 at the measuring point.

- 1 **5.** The method as claimed in claim 2, characterized in that a product of cut-off frequency
2 f_{Gu} and the flow speed v is between 0.001 m/s^2 to 0.01 m/s^2 at the measuring point.

- 1 **6.** The method as claimed in claim 1, characterized in that a disturbance of the
2 electromagnetic field generated by a transmitter coil is detected on the basis of a
3 disturbance of the voltage induced in a receiver coil.

1 **7.** An apparatus for detecting non-metallic components in a flowing metallic melt with at
2 least one transmitter coil which is flowed through by an alternating current for
3 generating an electromagnetic field which penetrates the flowing melt at least partly,
4 a measuring element for measuring disturbances of the field at a measuring point which
5 is flowed through by the melt and with an evaluating device, characterized by a first
6 filter element which guides the disturbances of the electromagnetic field above a lower
7 cut-off frequency f_{Gu} into a first channel with which non-metallic components can be
8 detected which are entrained by the melt and are expanded especially in the direction
9 of flow, and by a second filter element which guides the disturbances of the
10 electromagnetic field above an upper cut-off frequency f_{Go} into a second channel with
11 which components can be detected which are distributed in the melt and are entrained
12 in a discrete manner.

1 **8.** The apparatus as claimed in claim 7, characterized by a summing element in at least
2 one channel, in which the measured values detected in the channel are summed up into
3 a summary value and by an amplitude filter which triggers a signal when the summary
4 value exceeds a limit amplitude.

1 **9.** The apparatus as claimed in claim 7, characterized in that the product of upper cut-off
2 frequency f_{Go} and a flow speed v is between 0.1 m/s^2 to 10 m/s^2 at the measuring point.

1 **10.** The apparatus as claimed in claim 7, characterized in that the product of lower cut-off
2 frequency f_{Gu} and the flow speed v is between 0.001 m/s^2 to 0.01 m/s^2 at the measuring
3 point.

1 **11.** The apparatus as claimed in claim 7, characterized in that a measuring element is a
2 receiver coil and that disturbances of the electromagnetic field at a measuring point can
3 be detected on the basis of disturbances of the voltage induced in the receiver coil.

- 1 **12.** The apparatus as claimed in claim 7, characterized in that the transmitter coil can also
2 be flowed through by the melt.
- 1 **13.** The apparatus as claimed in claim 7, characterized in that the transmitter coil is
2 simultaneously the measuring element.
- 1 **14.** The apparatus as claimed in claim 11, characterized in that the transmitter and/or
2 receiver coil are each individually arranged in a metallic housing which is at least
3 partly non-ferromagnetic.
- 1 **15.** The apparatus as claimed in claim 11, characterized in that the transmitter and receiver
2 coils are arranged in a common metallic housing which is at least partly
3 non-ferromagnetic.
- 1 **16.** The apparatus as claimed in claim 11, characterized in that the transmitter and receiver
2 coil are axially spaced from each other and are separated from each other by a metallic
3 wall and either both coils are arranged in a common housing or each coil is housed in
4 a separate housing, with the housing(s) consisting of a metallic material and the
5 metallic material being non-ferromagnetic at least in sections.
- 1 **17.** The apparatus as claimed in claim 11, characterized in that the transmitter and receiver
2 coils are integrated in at least one section of the pouring channel of a metallurgical
3 vessel.
- 1 **18.** A method of using the apparatus as claimed in claim 7, for initiating a warning signal
2 and/or a control signal for triggering a flow control device and/or a device for
3 modifying the flow of the metallic melt when detecting discrete and/or contiguous
4 impurities.